

## Queue Detection and Count Information System

**RESULTS AND PROJECT DESCRIPTION:** *The Queue Detection System (QDS) and Count Information System (CIS) is a Web-based application intended to help mitigate traffic incidents that occur on an exit-ramp in Redding California (Old Oregon Trail). When a traffic queue is detected via inductor loops, a Changeable Message Sign (CMS) located upstream, (prior to the Hawley/Churn Creek exit) is activated to let motorists know that slow or stopped traffic conditions are ahead. The QDS and CIS are both independent programs accessible by using an internet browser. The QDS provides control over all the CMS properties (on/off, message, communications). The CIS controls the data gathering and analysis of the loop data. The system uses Windows 2003 Server and Apache Tomcat as a servlet container, which provides the Web service. All data is kept in a MySQL database located on the server.*

*The system provides personnel in the Transportation Management Center more control during times of traffic incident and provides logs of past traffic data for reference. The layout of the Graphical Users Interface has a web feel to it, providing users with an easy to navigate interface, common with what they see day to day on the web. The CIS/QDS helps makes the roads more reliable by warning motorists of potential hazards.*

### Research Project Partners

District 2 (Redding, CA) requested HQ Traffic Operations assistance in developing this software. The Division of Research and Innovation (DRI) is supporting HQ Traffic Ops in writing the software. District 2 is funding the equipment. Thus, this is a partnership amongst DRI, District 2, and HQ Traffic Operations.

### Why We Pursued This Research

This project provides technical assistance to District 2 for deployment of a project. It improves Safety by preventing potential hazards. It makes roads more reliable by warning drivers of potential hazards. This also increases safety of potential hazardous conditions. It gives District 2 users more control during times of traffic incidents and also provides logs of past traffic data for reference. The following diagrams show all modules and how they are linked.

### Software and User Interface Considerations

Users are able to log in and view data or manipulate the controls needed to communicate with both the loops and the CMS. All data is kept on a database located in the server. The layout of the graphical user interface has a web feel to it, thus providing users with an easy to navigate interface, common with what they see day to day on the Web, as shown in Figure 4.

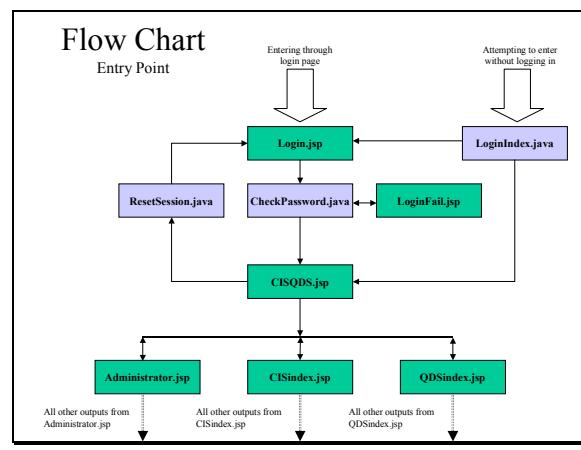


Figure 1 – Entry Point Flow Chart

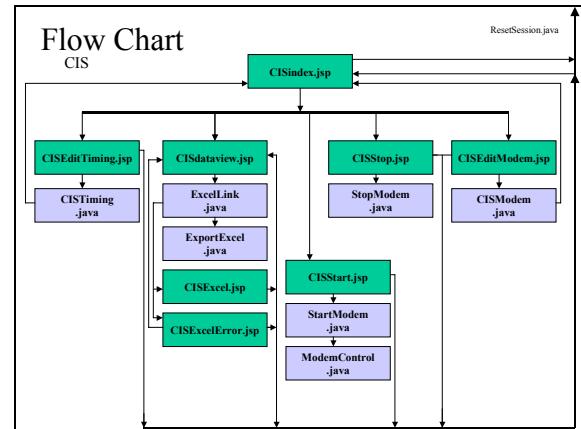


Figure 2 – Count Information System Flow Chart

The CIS is a fully automated polling program that is controlled by changing values on the web-pages. When the CIS is started it loads up all communication variables from a database. Using these variables it attempts to connect via P.O.T.S (Plain Old Telephone Service) to a remote traffic controller that is polling loops placed in the off-ramp. Traffic Controllers always give the occupancy from the previous minute and the current car speeds. The server gathers this data once a minute. This data is stored and tested to compare the speed and verify if it is too slow (compares to a speed flag assigned by user). It then compares how many successive times the traffic has been this slow, if it is under the flagged amount three times in a row then the QDS portion of the program is flagged to turn on the CMS. The program will continue to gather data for an indicated period or the user tells CIS to stop. The program will continue to monitor the traffic sensors incase there is an incident even if the CIS was instructed not to store data. The user can view real time data or view past archived data for the CIS.

The QDS is also fully automated and controlled from the web. When a user logs in and enters the QDS page they have full control over variables used to communicate with the CMS. Upon turning on the QDS the system stays idle until a flagged by CIS triggers. At this point the QDS dials the CMS and checks if the sign is already in use. If it is on, a message is sent via email to a list (editable in administrator page) to alert users that an incident is occurring and CMS already in use. Otherwise the CMS is turned on and users are notified through email. After the program writes to the CMS, it goes back into standby until it gets a notice from CIS that incident is over. It once again dials the CMS and checks if the messages match, if they do not a message is sent to users indicating an override has occurred. Otherwise it turns off the CMS.

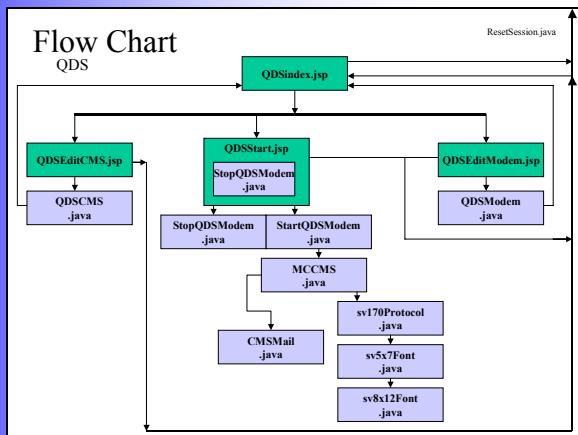


Figure 3 – Queue Detection Flow Chart

## Security Considerations

Different levels of access provide security. Administrative functions are only accessible by users with administrator access. With administrator access, user and email accounts can be changed or added.

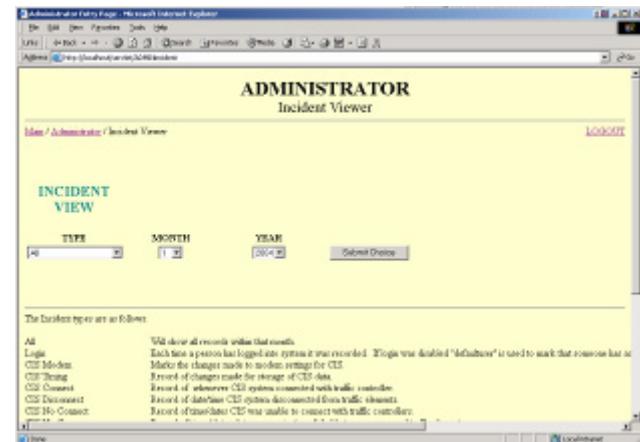


Figure 4 – Incident Viewer Selection

Figure 5 – Administrator Access

## For More Information About This Research

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